

Remarks

Amendments to the Claims

Claims 1 and 2 have been canceled.

Independent claim 3 has been amended to recite the use of a self piercing rivet comprising a head attached to a hollow cylindrical shank with a tapered end. The use of such a rivet is illustrated in each of the four drawing figures and, for example, in paragraphs 0013, 0021, 0022, 0025, and 0029 of the specification. The hollow shank encloses material from the first component within its hollow as illustrated in Figure 4. Material captured in the hollow center of the rivet may contribute to the weld that is formed in the process as disclosed in paragraph 0025. Benefits of using a hollow shank rivet are further described in paragraph 0029.

Claim 3 has also been amended to clarify its reference to an interface for a weld between the shank of the rivet and the second component (for example at weld nugget 48 in Figure 4). Dependent claim 5 has been amended to clarify its reference to the welding interface.

Independent claim 7 has also been amended to recite the use of a ferrous rivet with a hollow cylindrical shaft and tapered end to penetrate the first component, enclosing some of it, and penetrating into the ferrous component for the rivet/weld bond.

New claims 8 and 9 have been added as dependent on claim 7. These dependent claims identify the non-ferrous component as comprising a metal alloy (claim 8) or comprising a polymer composition (claim 9).

A new independent claim 10 has been added to recite a preferred and specifically illustrated embodiment of applicants' invention. The method of claim 10 joins a sheet portion of a non-ferrous component to a ferrous tube as illustrated in the drawing figures and related text. New dependent claims 11 and 12 further recite the composition of the non-ferrous component like dependent claims 8 and 9.

The Claim Rejections

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. It is believed that the amendments to claims 3 and 5 meet this rejection and it is requested that it be withdrawn.

Claims 3-4, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Sunamoto et al. '498.

Claims 3-6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over McCorvey et al '283.

It is respectfully requested that each of these rejections be reconsidered and withdrawn for the following reasons.

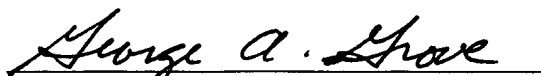
Neither the Sunamoto et al patent (hereafter Sunamoto for brevity) nor the McCorvey et al patent (McCorvey) teach or suggest applicants' process for joining dissimilar materials using a self-piercing rivet comprising a head and hollow cylindrical shank with a tapered end. Applicants use of a hollow rivet shank provides more contact area for mechanical and welded attachment between dissimilar materials than a solid rivet of the same diameter and external contact surface. Neither reference discloses such a method of forming a mechanical and welded attachment between dissimilar materials.

McCorvey's welding pin 10 has a cylindrical shank portion 11 with a pointed end 12. But this welding pin is not the same as, nor suggestive of, applicants' hollow cylindrical rivet shank. The McCorvey welding pin cannot function in a joining process like applicants' hollow shank.

Similarly, Sunamoto's anchor peg W3 and connecting portion W5 do not teach or suggest applicants' claimed joining process using a hollow cylindrical rivet shank.

It is respectfully requested that the rejections of claims 3-7 be reconsidered and withdrawn. It is urged that claims 3-12 be allowed and this case passed to issue.

Respectfully Submitted,



George A. Grove, Reg. No. 23023
Reising, Ethington, Barnes, Kisselle, P.C.
P.O. Box 4390
Troy, Michigan 48099-4390
248-689-3500

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Brenda M. Rivard
Assistant to George A. Grove